

WHAT IS CLAIMED IS:

1. A method for provisioning protection paths comprising:
determining network configuration information for a network formed by a plurality of nodes;
5 identifying a working path from a source node to a destination node spanning one or more intermediate nodes, wherein the source node, the destination node, and the intermediate nodes are all nodes in the network;
determining a timing constraint for failure recovery;
identifying potential nodes in the network that satisfy the timing constraint
10 based on the network configuration information;
selecting a protection path from the source node to the destination node spanning a second set of one or more intermediate nodes, the second intermediate nodes selected from the potential nodes; and
setting up the protection path.
15
2. The method of Claim 1, wherein the network configuration information comprises topological information and timing information, wherein the topological information describes the interconnections between the nodes in the network, and wherein the timing information includes data regarding recovery
20 response times for the nodes in the network.
3. The method of Claim 2, wherein the timing information indicates propagation delays for control messages passing between the nodes in the network and reconfiguration delays for the nodes in the network to reconfigure in the event of
25 a failure recovery.
4. The method of Claim 3, wherein identifying the potential nodes that satisfy the timing constraint comprises identifying selected ones of the nodes in the network that can provide failure recovery within the timing constraint based upon the
30 propagation delays and the reconfiguration delays.

5. The method of Claim 1, further comprising maintaining obligation information specifying a plurality of failure obligations, each failure obligation indicating, with respect to one of the nodes in the network, obligations of other ones of the nodes in the network given a failure of the one node.

5

6. The method of Claim 1, wherein identifying the potential nodes in the network that satisfy the timing constraint further comprises identifying the potential nodes in the network that satisfy the timing constraint based on the network configuration information and the failure obligations.

10

7. The method of Claim 1, wherein determining the timing constraint comprises:

identifying a class of service associated with the working path; and
selecting the timing constraint based upon the class of service.

15

8. The method of Claim 1, wherein determining the timing constraint comprises receiving a configured value for the working path.

9. The method of Claim 1, wherein the network has a mesh topology, and
20 wherein each of the nodes in the network comprises an optical network node.

10. The method of Claim 1, further comprising:
identifying a fault condition at a reporting one of the nodes in the network;
generating a fault message identifying the fault condition; and
25 broadcasting the fault message to all of the nodes in the network.

11. The method of Claim 1, wherein identifying the potential nodes that satisfy the timing constraint comprises determining selected ones of the nodes in the network that satisfy the timing constraint based upon a failure reported from any one
30 of the source node, the destination node, and the intermediate nodes.

12. Logic for provisioning protection paths, the logic encoded in media and operable when executed to perform the steps of:

determining network configuration information for a network formed by a plurality of nodes;

5 identifying a working path from a source node to a destination node spanning one or more intermediate nodes, wherein the source node, the destination node, and the intermediate nodes are all nodes in the network;

determining a timing constraint for failure recovery;

10 identifying potential nodes in the network that satisfy the timing constraint based on the network configuration information;

selecting a protection path from the source node to the destination node spanning a second set of one or more intermediate nodes, the second intermediate nodes selected from the potential nodes; and

setting up the protection path.

15

13. The logic of Claim 12, wherein the network configuration information comprises topological information and timing information, wherein the topological information describes the interconnections between the nodes in the network, and wherein the timing information includes data regarding recovery response times for the nodes in the network.

20

14. The logic of Claim 13, wherein the timing information indicates propagation delays for control messages passing between the nodes in the network and reconfiguration delays for the nodes in the network to reconfigure in the event of a failure recovery.

25

15. The logic of Claim 14, further operable when executed to identify the potential nodes that satisfy the timing constraint by identifying selected ones of the nodes in the network that can provide failure recovery within the timing constraint based upon the propagation delays and the reconfiguration delays.

30

16. The logic of Claim 12, further operable when executed to maintain obligation information specifying a plurality of failure obligations, each failure obligation indicating, with respect to one of the nodes in the network, obligations of other ones of the nodes in the network given a failure of the one node.

5

17. The logic of Claim 12, further operable when executed to identify the potential nodes in the network that satisfy the timing constraint by identifying the potential nodes in the network that satisfy the timing constraint based on the network configuration information and the failure obligations.

10

18. The logic of Claim 12, further operable when executed to determine the timing constraint by:

identifying a class of service associated with the working path; and
selecting the timing constraint based upon the class of service.

15

19. The logic of Claim 12, further operable when executed to determine the timing constraint by receiving a configured value for the working path.

20. The logic of Claim 12, wherein the network has a mesh topology, and wherein each of the nodes in the network comprises an optical network node.

20

21. The logic of Claim 12, further operable when executed to perform the steps of:

identifying a fault condition at a reporting one of the nodes in the network;
generating a fault message identifying the fault condition; and
broadcasting the fault message to all of the nodes in the network.

25

22. The logic of Claim 12, further operable when executed to identify the potential nodes that satisfy the timing constraint by determining selected ones of the nodes in the network that satisfy the timing constraint based upon a failure reported from any one of the source node, the destination node, and the intermediate nodes.

30

23. A network node comprising:
a network interface operable to couple to a network formed by a plurality of other nodes
a memory maintaining network configuration information for the network;
5 a controller operable to:
identify a working path from the network node to a destination node spanning one or more intermediate nodes, wherein the destination node and the intermediate nodes are all other nodes in the network;
determine a timing constraint for failure recovery;
10 identify potential nodes in the network that satisfy the timing constraint based on the network configuration information;
select a protection path from the network node to the destination node spanning a second set of one or more intermediate nodes, the second intermediate nodes selected from the potential nodes; and
15 initiate setup of the protection path.
24. The network node of Claim 23, wherein the network configuration information comprises topological information and timing information, wherein the topological information describes the interconnections between the nodes in the
20 network, and wherein the timing information includes data regarding recovery response times for the nodes in the network.
25. The network node of Claim 24, wherein the timing information indicates propagation delays for control messages passing between the nodes in the
25 network and reconfiguration delays for the nodes in the network to reconfigure in the event of a failure recovery.
26. The network node of Claim 25, wherein the controller is further operable to identify the potential nodes that satisfy the timing constraint by
30 identifying selected ones of the nodes in the network that can provide failure recovery within the timing constraint based upon the propagation delays and the reconfiguration delays.

27. The network node of Claim 23, wherein the memory is further operable to maintain obligation information specifying a plurality of failure obligations, each failure obligation indicating, with respect to one of the nodes in the network, obligations of other ones of the nodes in the network given a failure of the one node.

28. The network node of Claim 23, wherein the controller is further operable to identify the potential nodes in the network that satisfy the timing constraint further by identifying the potential nodes in the network that satisfy the timing constraint based on the network configuration information and the failure obligations.

29. The network node of Claim 23, wherein the controller is further operable to determine the timing constraint by:
identifying a class of service associated with the working path; and
selecting the timing constraint based upon the class of service.

30. The network node of Claim 23, wherein the controller is further operable to determine the timing constraint by receiving a configured value for the working path.

31. The network node of Claim 23, wherein the network has a mesh topology, and wherein each of the nodes in the network comprises an optical network node.

32. The network node of Claim 23, wherein the controller is further operable to:
identify a fault condition at a reporting one of the nodes in the network;
generate a fault message identifying the fault condition; and
broadcast the fault message to all of the nodes in the network using the network interface.

33. The network node of Claim 23, wherein the controller is further operable to identify the potential nodes that satisfy the timing constraint by determining selected ones of the nodes in the network that satisfy the timing
5 constraint based upon a failure reported from any one of the network node, the destination node, and the intermediate nodes.